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मसाले — लौंग,  
साबुत एवं पिसी — विशिष्टि  
( चौथा पुनरीक्षण )

**Spices and Condiments — Cloves,  
Whole and Ground — Specification**  
( *Fourth Revision* )

ICS 67.220.10

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## FOREWORD

This Indian Standard (Fourth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Spices and Condiments Sectional Committee had been approved by the Food and Agriculture Divisional Council.

Cloves (*LAUNG*) is one of the important minor spices. It is widely used for medicinal purposes as it contains an essential oil which possesses antiseptic value. The culinary value of cloves as a seasoning agent is also well established.

Originally two separate Indian Standards, IS 4404 and IS 4405 were issued on specification for cloves whole and cloves powder respectively in 1967. In the first revision of IS 4404 in 1975, the requirements of cloves powder in IS 4405 were incorporated in IS 4404. Consequently, IS 4405 was withdrawn. In the second revision in 1992, the requirements for cloves, whole and ground were updated to align with ISO Standard on the subject, ISO 2254 'Cloves, whole and ground (powdered) — Specification'. In the third revision in 2010, the requirements were updated to align with the standards for cloves, whole and ground, laid down under the Prevention of Food Adulteration Rules, 1955 and also with the revised ISO Standard published in 2004. The categorization of cloves, whole, into three grades were removed and only a single specification was prescribed for cloves, whole. This fourth revision is being carried out to align the standard with regulations laid under *Food Safety and Standards Act*, 2006 regarding microbiological requirements, limits for aflatoxin and the references of this standard have been updated.

In the preparation of this standard due consideration has been given to the *Food Safety and Standards Act*, 2006 and the Rules and the Regulations framed thereunder and the *Legal Metrology (Packaged Commodities) Rules*, 2011. However, this standard is subject to restrictions imposed under these rules, wherever applicable.

The composition of the technical committee responsible for formulation of this standard is given at Annex C.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

# *Indian Standard*

## SPICES AND CONDIMENTS — CLOVES, WHOLE AND GROUND — SPECIFICATION

### ( Fourth Revision )

#### 1 SCOPE

**1.1** This standard prescribes the requirements and methods of test for whole and ground cloves [*Syzygium aromaticum* (L.) Merril et L. M. Perry].

**1.2** This standard also covers the recommendation relating to the storage and transport conditions for cloves (*see* Annex A) for information.

#### 2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
1070 : 1992	Reagent grade water ( <i>third revision</i> )
1797 : 2017	Spices and condiments — Methods of test ( <i>third revision</i> )
5887 (Part 3/Sec 1) : 2020/ISO 6579-1 : 2017	Methods for detection of bacteria responsible for food poisoning: Part 3 Horizontal Method for the Detection, Enumeration and Serotyping of <i>Salmonella</i> Section 1 Detection of <i>Salmonella</i> spp. ( <i>third revision</i> )
5887 (Part 6) : 2012/ ISO 7932 : 2004	Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of presumptive bacillus cereus: Part 6 Colony — Count technique at 30 °C ( <i>first revision</i> )
13145 : 2014	Spices and condiments — Methods of sampling ( <i>second revision</i> )

#### *IS No.*

#### *Title*

14216 : 1994	Code for hygienic conditions for spices and condiments processing units
ISO 15213 : 2003	Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of sulfite- reducing bacteria growing under anaerobic conditions
16287 : 2015	Foodstuffs — Determination of aflatoxin B1, and the total content of aflatoxins B1, B2, G1 and G2 in cereals, nuts and derived products — High performance liquid chromatographic method

#### 3 TERMINOLOGY

**3.1 Whole Clove** — Clove, whole, is the floral bud, harvested before blooming, and dried, of *Syzygium aromaticum* (L.) Merr. et L. M. Perry (*see* Fig. 1). The lower portion of the clove consists of a slightly flattened four sided hypanthium and exudes oil when indented with a finger nail. The hypanthium contains in its upper part two loculi containing numerous ovules and is crowned by four acute divergent sepals surrounding a dome-shaped head consisting of four paler unexpanded membranous imbricate petals enclosing numerous incurved stamens and a single stiff erect style.

**3.2 Headless Clove** — Clove consisting of only the receptacle and sepals and which has lost the domeshaped head (*see* Fig. 2).

**3.3 Khoker Clove** — Clove which has undergone fermentation as a result of incomplete drying, as evidenced by its pale brown colour, whitish mealy appearance and, often, wrinkled surface.

**3.4 Mother Clove** — Fruit of the clove tree (*Syzygium aromaticum*), which is in the form of an ovoid brown berry surmounted by four incurved sepals (*see* Fig. 3).

**3.5 Clove Stem** — Dry fragment of the stalk of the clove (*see* Fig. 4).



FIG. 1 WHOLE CLOVE

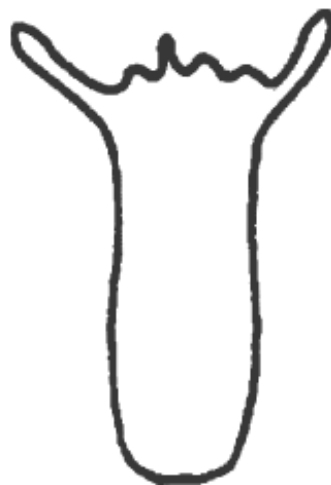


FIG. 2 HEADLESS CLOVE



FIG. 1 MOTHER CLOVE



FIG. 1 CLOVE STEAM

**3.6 Ground (Powdered) Clove** — Powder obtained by grinding cloves without any addition.

#### 4 REQUIREMENTS

##### 4.1 Odour and Flavour

Whole or ground (powdered) cloves shall have a strong aromatic, spicy odour and characteristic flavour. They shall be free from off-flavours, including mustiness.

##### 4.2 Colour

**4.2.1** Whole cloves shall be of a reddish-brown to blackish-brown colour.

**4.2.2** Ground (powdered) cloves shall be of a brown colour with a violet tinge.

##### 4.3 Absence of Moulds, Insects, etc

The cloves, whole or ground (powdered), shall be free from living insects and moulds, and shall be practically free from dead insects, insect fragments and rodent contamination visible to the naked eye (corrected if necessary, for abnormal vision), with such magnification as may be necessary in any particular case. If the magnification exceeds  $\times 10$ , this fact shall be stated in the test report. The proportion of insect damaged cloves shall not exceed 2 percent (m/m).

#### 4.4 Extraneous Matter

Extraneous matter in cloves, whole, includes the following:

- a) Dirt, dust, mud, stones, pieces of wood, etc;
- b) All the particles originating from the plant other than the cloves, tendrils and peduncles; and
- c) Exhausted cloves.

The proportion of extraneous matter in cloves, when determined by the method specified in 4 of IS 1797, shall not exceed 1.0 percent (m/m).

**4.5** Cloves, whole and ground, shall also comply with the requirements given in Table 1 and Table 2.

**4.6** Cloves, whole and ground, shall be manufactured and packed under hygienic conditions (*see* IS 14216).

**4.7** Pesticide residues and metallic contaminants in the product shall not exceed the limits as prescribed in the *Food Safety and Standards (Contaminants, Toxins and Residues) Regulation, 2011*.

### 5 PACKING AND MARKING

#### 5.1 Packing

Cloves, whole and ground, shall be packed in clean, sound and dry container made of metal, glass, food grade polymers, wood or jute bags. The wooden boxes or jute bags shall be suitably lined with moisture-proof lining which does not impart any foreign smell to the product. The packing material shall be free from any fungal or insect infestation and should not impart any foreign smell. Each container shall be securely closed and sealed.

#### 5.2 Marking

The following particulars shall be legibly and indelibly marked or labelled on each container of cloves, whole or ground:

- a) Name and address of the manufacturer or packer;
- b) Name of the material (whole or ground);
- c) Trade-name or brand name, if any;
- e) Batch or code number;
- f) Net quantity;
- g) Best before date;
- h) Year of the harvest (in case of whole);
- j) Date of packing (in case of ground); and
- k) Any other markings required under the *Legal Metrology (Packaged Commodities) Rules, 2011*, and the *Food Safety and Standards (Packaging and Labelling) Regulation, 2011*.

#### 5.3 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

### 6 SAMPLING

Representative samples of the material shall be drawn and tested for conformity to this standard as prescribed in IS 13145.

### 7 METHODS OF TEST

The samples of cloves, whole and ground, shall be tested for ascertaining conformity of the material to the requirements in accordance with the relevant clauses given in Table 1 and Table 2.

### 8 QUALITY OF REAGENTS

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070) shall be employed in tests.

**Table 1 Requirements for Cloves, Whole and Ground**

( Clauses 4.5 and 7 )

Sl No.	Requirement	Whole	Ground	Method of Test, Ref to
(1)	(2)	(3)	(4)	(5)
i)	Headless cloves, percent by mass, <i>Max</i>	2.0	–	Physical separation and weighing
ii)	Tendrils, mother cloves, percent by mass, <i>Max</i>	2.0	–	Physical separation and weighing
iii)	Khoker cloves, percent by mass, <i>Max</i>	2.0	–	Physical separation and weighing
iv)	Moisture content, percent by mass, <i>Max</i>	12.0	10.0	9 of IS 1797
v)	Volatile oil on dry basis (ml/100 g), <i>Min</i>	17.0	16.0	15 of IS 1797
vi)	Total ash content on dry basis, percent by mass, <i>Max</i>	–	7.0	6 of IS 1797
vii)	Acid insoluble ash on dry basis, percent by mass, <i>Max</i>	–	0.5	8 of IS 1797
viii)	Crude fibre, percent by mass, <i>Max</i>	–	13.0	13 of IS 1797
ix)	Total Aflatoxin, percent by mass, <i>Max</i>	30 µg/kg	30 µg/kg	IS 16287
x)	Aflatoxin B1, percent by mass, <i>Max</i>	15 µg/kg	15 µg/kg	IS 16287

**Table 2 Microbiological Requirements for Cloves, Whole and Ground**

( Clauses 4.5 and 7 )

SI No.	Characteristic	Requirement				Method of Test, Ref to IS or ISO
		Sampling Plan <sup>1)</sup>		Limit (cfu/g)		
		n	c	m	M	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(i)	<i>Salmonella</i>	5	0	Absent/25g	NA	IS 5887 (Part 3)
(ii)	<i>Bacillus cereus</i>	5	2	1 × 10 <sup>3</sup>	1 × 10 <sup>4</sup>	IS 5887 (Part 6)
(iii)	Sulphite Reducing Clostridia (SRC)	5	2	1 × 10 <sup>2</sup>	1 × 10 <sup>3</sup>	ISO 15213

<sup>1)</sup> For sampling plan see Annex B.

**ANNEX A**

( Clause 1.2 )

**RECOMMENDATIONS FOR STORAGE AND TRANSPORTATION OF CLOVES**

**A-1** The containers of cloves should be stored in covered premises, well protected from the sun, rain and excessive heat.

**A-2** The store room should be dry, free from objectionable odours, and proofed against entry of insects and vermin. The ventilation should be controlled so as to give good ventilation under dry conditions and to be fully closed under damp conditions. In a storage

warehouse, suitable facilities should be available for fumigation.

**A-3** The containers should be so handled and transported that they are protected from the rain, from the sun or other source of excessive heat, from objectionable odours and from cross-infestation, especially in the holds of ships.

**ANNEX B**

( Table 2 )

**SAMPLING PLAN FOR MICROBIOLOGICAL REQUIREMENTS****B-1 SAMPLING PLAN FOR MICROBIOLOGICAL REQUIREMENTS**

The terms n, c, m and M used in this standard have the following meaning:

- n = Number of units comprising a sample;  
 c = Maximum allowable number of units having microbiological counts above m for 2-class sampling plan and between m and M for 3-class sampling plan;

m = Microbiological limit that separates unsatisfactory from satisfactory in a 2-class sampling plan or acceptable from satisfactory in a 3-class sampling plan; and

M = Microbiological limit that separates unsatisfactory from satisfactory in a 3-class sampling plan.

**B-2 INTERPRETATION OF RESULTS**

<b>2-Class Sampling Plan (where n, c and m are specified)</b>	<b>3-Class Sampling Plan (where n, c, m and M are specified)</b>
1. Satisfactory, if all the values observed are $\leq m$ 2. Unsatisfactory, if one or more of the values observed are $> m$ .	1. Satisfactory, if all the values observed are $\leq m$ 2. Acceptable, if a maximum of c values are between m and M. 3. Unsatisfactory, if one or more of the values observed are $> M$ or more than prescribed c values are $> m$

## ANNEX C

( Foreword )

## COMMITTEE COMPOSITION

Spices, Culinary Herbs and Condiments Sectional Committee, FAD 09

<i>Organization</i>	<i>Representative(s)</i>
Spices Board, Kochi	DR A. B. REMA SHREE, DIRECTOR RESEARCH ( <b>Chairman</b> )
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SHRIMATI NAVITA YADAV SCIENTIST 'D' (FAD), BIS	





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### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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